

ONK Onkaparinga Land System

Upper Onkaparinga Valley between Mount Torrens and Oakbank

Area: 47.9 km²

Annual rainfall: 765 – 870 mm average

Geology: The landscape is underlain by phyllites, fine grained schists and slates of the Saddleworth, Stonyfell and Mintaro Formations. There are sporadic reefs of Stonyfell Quartzite. Dissection by the Onkaparinga River and its tributaries has been considerable and there are extensive deposits of alluvium in valley floors between the basement rock highs. These tend to be fine grained in narrow valleys but coarser grained on the Onkaparinga flats.

Topography: The Land System includes the upper section of the Onkaparinga River catchment. The alluvial flats and adjacent outwash fans dominate the landscape. Western Branch Creek, which flows along the western side of the System, joins the Onkaparinga at Oakbank at the southern end. Between these two south flowing watercourses is a range of low hills. Similar low hills, dissected by small tributary streams, flank the northern and eastern sides of the System. The hills are undulating to rolling, with slopes generally less than 20%.

Elevation: 330 m in the south where the Onkaparinga flows out, to 500 m on the northern watershed.

Relief: Up to 50 m

Main soils: The soils on the basement rock rises are almost all loamy texture contrast types, moderately deep to deep over rock. Related but deeper texture contrast soils characterize lower slopes. On valley flats there is a range of texture contrast and uniform to gradational coarse textured soils.

Main soils

Soils formed in deeply weathered basement rock

F1 Loam to sandy loam over brown clay - on fine grained rock (**F1a**) or coarse grained rock (**F1b**)

Soils formed in weathering basement rock

K3 Acidic sandy loam over red clay

K2 Acidic loam over brown (**K2a**) or red (**K2b**) clay

Soils formed in alluvial outwash sediments

F1 Sandy loam to loam over brown clay (**F1c**) to sandy clay (**F1d**)

Minor soils

Soils formed in deeply weathered basement rock

K1 Acidic gradational loam

K4 Acidic sandy loam over brown clay

L1 Shallow stony sandy loam

Soils formed in alluvial outwash sediments

H3 Bleached siliceous sand

M1 Deep sandy loam



Main features: The Onkaparinga Land System is characterized by extensive alluvial flats and gently sloping outwash fans grading to undulating to rolling low hills. The alluvial landscapes occupy about 40% of the System. They have deep soils which are typically loamy with clayey subsoils in narrow valleys, and sandier with variable subsoils near the major water courses. They are moderately fertile and have ample water holding capacity, but many are imperfectly drained. The soils on the rising ground are loamy with clayey subsoils. They are generally moderately deep to deep, moderately well drained and inherently fertile. Except for some minor moderately steep slopes, all the land is at least semi arable, although all slopes are susceptible to erosion. There is significant potential for horticulture and other more intensive uses throughout.

Soil Landscape Unit summary: 9 Soil Landscape Units (SLUs) mapped in the Onkaparinga Land System:

| SLU | % of area | Main features # |
|------------|--------------|---|
| AqC | 1.5 | <p>Moderately inclined strike ridges formed on metamorphosed sandstones and quartzites of the Stonyfell Quartzite Formation. Slopes are 15% to 30% and relief is up to 20 metres. Rocky outcrop and surface stone are common. There is a range of soils, usually with gravelly sandy loam to sandy clay loam surfaces and variably coloured and structured clay subsoils, formed on fresh weathering or deeply weathered and kaolinitic micaceous sandstones. Shallow stony soils are common on steeper or rocky slopes. Deeper texture contrast soils occur on lower slopes.</p> <p>Main soils: <u>Acidic sandy loam over brown clay</u> - K4 (E) <u>Shallow sandy loam on rock</u> - L1 (C) on steeper rocky slopes <u>Acidic sandy loam over red clay</u> - K3 (L) <u>Sandy loam over brown clay on deeply weathered rock</u> - F1b (L)</p> <p>The land is non-arable, although most is suitable for perennial crops provided erosion is controlled. Despite the rocky reefs, most soils are moderately deep, moderately well drained and have adequate water holding capacities. Natural fertility is low, and all soils are prone to acidification. Most soils have poor surface structure, and are highly erodible.</p> |
| AxC | 5.5 | <p>Rolling slightly rocky low hills with relief to 50 m and slopes of 18-30%. Underlying rocks are phyllites, fine grained schists and slates. Soils are typically moderately deep loams with clayey subsoils over weathering rock.</p> <p>Main soils: <u>Acidic loam over brown or red clay</u> - K2a / K2b (E) on fine grained rocks <u>Acidic sandy loam over red clay</u> - K3 (C) on coarser grained rocks <u>Acidic gradational loam</u> - K1 (L) on fine grained rocks <u>Shallow sandy loam on rock</u> - L1 (L) on steeper rocky slopes</p> <p>Although non-arable due moderate slopes, this land has potential for productive perennial crops and pastures. The soils are moderately deep and well drained, and inherently fertile, although acidic. Erosion control during establishment phases is essential.</p> |
| BdC BdD | 42.0 12.7 | <p>Undulating rises, gentle slopes and moderately inclined upper slopes formed on phyllites, fine grained schists and slates. Slopes range from 4% to 18%, and relief varies from 20 to 50 m. Water courses are well defined and too narrow in their upper reaches to be mappable. Minor granitic outcrops occur in places.</p> <p>BdC Undulating low hills and gentle slopes with relief to 50 m and slopes of 4-10%. BdD Moderately inclined upper slopes with relief to 20 m and slopes of 10-18%.</p> <p>Soils are mostly moderately deep, overlying fine grained metamorphic rocks. They have loamy surfaces and variably coloured and structured subsoil clays. Deeper texture contrast soils occur on lower slopes and minor flats. Less well developed medium to fine grained soils on deeply weathered rocks occur on upper slopes.</p> <p>Main soils: <u>Acidic loam over brown to red clay on rock</u> - K2b / K2a (E) on fine grained rocks <u>Acidic sandy loam over red clay on rock</u> - K3 (C) on quartzitic and coarser grained rocks <u>Loam to sandy loam over brown clay</u> - F1a / F1b (L) on lower slopes <u>Acidic gradational loam</u> - K1 (L) on upper slopes <u>Sandy loam over brown clay</u> - F1c (M) on unmappable creek flats</p> <p>This land is arable with mostly deep, naturally fertile and moderately well drained soils. Slight</p> |



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| | | limitations are caused by poorly structured hard setting surface soils, and susceptibility to acidification and associated manganese toxicity. This is potentially some of the most productive land in the Mount Lofty Ranges, but more intensive development must be accompanied by appropriate erosion control. |
| LHA LHE | 9.1 3.8 | <p>Broad flats and narrow valleys of the Onkaparinga River and Western Branch Creek, formed on medium to coarse grained sediments. Larger water courses (notably the Onkaparinga) are incised up to 10 metres.</p> <p>LHA Broad river flats with slopes of 0-2%. LHE Narrow drainage valleys with slopes of 0-5%.</p> <p>Most soils have sandy to loamy surfaces and brown and yellow mottled sandy clay to clay subsoils. Deep alluvial soils occur near watercourses.</p> <p>Main soils: <u>Sandy loam over brown sandy clay</u> - F1d (E) <u>Sandy loam over brown clay</u> - F1c (C) <u>Deep sandy loam</u> - M1 (L) <u>Bleached siliceous sand</u> - H3 (L)</p> <p>Up to 100 cm of recent (flood deposited) silty to loamy sediments can overlie these soils. The soils are imperfectly to moderately well drained, deep with moderately low to moderate fertility. Being on river flats, productive potential is high, although there is a constant risk of flooding and stream bank erosion. There is minor soil salinity.</p> |
| LeB LeC LeE | 4.0 16.3 5.1 | <p>Broad, shallow drainage depressions, and gently undulating to undulating lower slopes of up to 10% formed on medium to fine grained alluvium derived from the erosion of basement siltstones, shales, phyllites and schists, associated with very deeply weathered medium to fine grained rocks.</p> <p>LeB Lower slopes, 2-4%. LeC Lower slopes, 4-8%. LeE Shallow valleys with slopes of up to 10%.</p> <p>All the major soils have texture contrast profiles with sandy to loamy surfaces and mottled brown, yellow and grey clay subsoils. Variations between the different soils are due to drainage conditions, grain size of the parent sediments and ironstone gravel content.</p> <p>Main soils: <u>Sandy loam over brown clay</u> - F1d (E) on alluvium <u>Loam over brown clay</u> - F1a (C) } on deeply weathered rock <u>Sandy loam over brown clay</u> - F1b (C) }</p> <p>These soils are deep, fertile and moderately well to imperfectly drained. Productive potential is high provided that temporary waterlogging can be managed. There is potential for erosion on the steeper slopes. There is minor saline seepage on lower slopes.</p> |

PROPORTION codes assigned to soils within Soil Landscape Units (SLU):

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|--|---------------------------------------|
| (D) Dominant in extent (>90% of SLU) | (C) Common in extent (20–30% of SLU) |
| (V) Very extensive in extent (60–90% of SLU) | (L) Limited in extent (10–20% of SLU) |
| (E) Extensive in extent (30–60% of SLU) | (M) Minor in extent (<10% of SLU) |

Detailed soil profile descriptions:

Soils formed in weathering basement rock

K1 Acidic gradational loam (Mesotrophic, Red Dermosol)

Thick fine sandy loam with minor ironstone grading to a brownish or reddish coarsely blocky clay loamy to clayey subsoil, siltier with depth, grading to kaolinized phyllite or siltstone, continuing to depths of 200 cm or more.

K2a Acidic loam over brown clay on rock (Eutrophic, Brown Kurosol)

Thick loam with a paler coloured gravelly A2 horizon, overlying a dark brown, yellowish brown and red mottled, coarsely structured clay subsoil, grading to weathering metasiltstone or phyllite deeper than 100 cm.

K2b Acidic loam over red clay on rock (Eutrophic, Red Kurosol)

Medium thickness reddish loam to clay loam with a gravelly and paler coloured A2 horizon, overlying a red, very well structured clay grading to weathering phyllite from about 100 cm.



- K3** Acidic sandy loam over red clay on rock (Bleached-Mottled, Eutrophic, Red Chromosol)
Medium thickness sandy loam with a paler or bleached A2 horizon, overlying a dark red and brown mottled prismatic structured clay, grading to weathering schist or phyllite by 100 cm.
- K4** Acidic sandy loam over brown clay on rock (Bleached-Mottled, Eutrophic, Brown Kurosol)
Thick, gravelly sandy loam with a bleached and gravelly A2 horizon, overlying a yellowish brown, red and greyish brown, coarsely prismatic clay subsoil, grading to weathering metasandstone below 100 cm.
- L1** Shallow stony sandy loam (Acidic, Lithic, Bleached-Leptic Tenosol)
Thick, greyish, very gravelly loamy sand to sandy loam with a bleached A2 horizon, grading to hard metasandstone by 50 cm.

Soils formed in deeply weathered basement rock

- F1a** Loam over brown clay (Eutrophic, Brown Kurosol)
Thick, dark brown sandy loam to clay loam with a bleached A2 horizon, overlying a brown, yellowish brown and red, coarsely blocky clay subsoil grading to grey and brown coarsely prismatic clay forming in weathering schist or phyllite, deeper than 200 cm.
- F1b** Sandy loam over brown clay (Bleached-Mottled, Mesotrophic, Brown Kurosol)
Thick grey loamy sand to loam with a gravelly and bleached A2 horizon, overlying a brown, yellowish brown and red coarsely prismatic sandy clay to clay subsoil, becoming siltier and greyer with depth. Soft weathering metasandstone occurs from about 150 cm.

Soils formed in alluvial outwash sediments

- F1c** Sandy loam to loam over brown clay (Bleached-Mottled, Eutrophic / Hypocalcic, Brown Chromosol)
Thick loamy sand to clay loam surface soil with a strongly bleached A2 horizon, sharply overlying a yellowish brown, grey and red mottled clay subsoil grading to fine grained alluvium.
- F1d** Sandy loam over brown clay (Bleached-Mottled, Eutrophic, Brown Chromosol)
Thick dark brown loamy sand to light sandy clay loam with a bleached A2 horizon, overlying a yellow brown and grey brown sandy clay with coarse prismatic structure, grading to a grey, brown and yellow mottled clayey sand.
- H3** Bleached siliceous sand (Regolithic, Bleached-Orthic Tenosol)
Very deep greyish brown massive sand, grading to white sand, overlying layers of brown, yellow and grey sand to clayey sand.
- M1** Deep sandy loam (Regolithic, Brown-Orthic Tenosol / Eutrophic, Brown Kandosol)
Thick brown sandy loam, overlying a grey to brown silty sand to silty clay loam with weak prismatic structure, grading to variable sandy, gritty and clayey alluvial sediments.

Further information: [DEWNR Soil and Land Program](#)

